Formulas To Know For FINAL!!

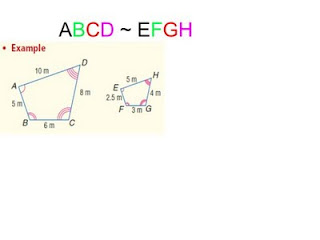
A starting point for those who are lost!

**CHAPTER SIX**

Ratios: a comparison of two quantities a:b, . a to b

Extended Ratios - a:b:c EX) The ratio of wins to losses to ties is 3:2:1. If the Union has played 18 games so far, what is their record? 3x + 2x + x = 18 6x=18 x = 3 Therefore 9 wins, 6 losses, 3 ties

**Proportions: set two ratios equal and cross multiply to solve!**

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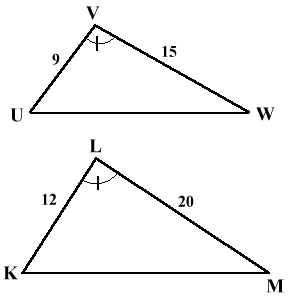
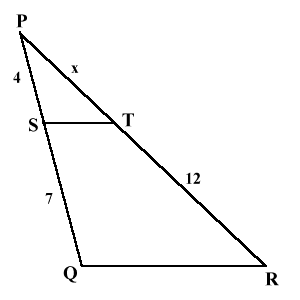
**Polygon Similarity:** two polygons are similar if and only is their corresponding angles are CONGRUENT and the measures of their corresponding sides are PROPORTIONAL!

**Scale factor** – ratio of a set of corresponding sides in similar polygons

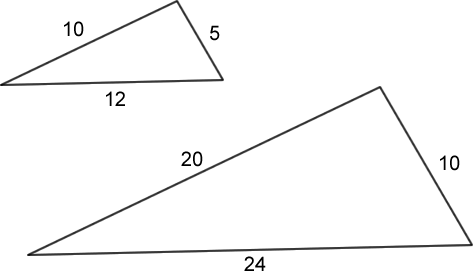
EX) for the quads to the right scale factor left to right is 2,

Scale factor right to left would be ½ !

**SAS~** If an angle of one triangle is congruent to an angle of a second triangle and the lengths of the sides that include these angles are proportional, then the triangles are similar!

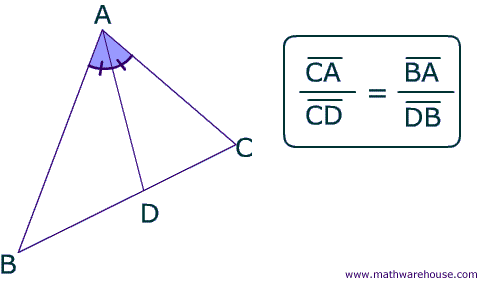
**SSS~** If the corresponding sides of two triangles are proportional, then the triangles are similar!

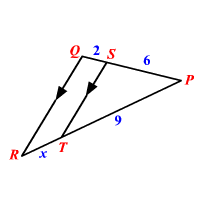


**AA~** If two angles in one triangle are congruent to two angles of another triangle, then the two angles are similar.

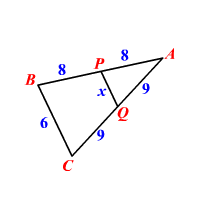


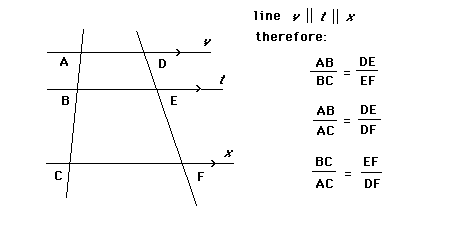
**Similar polygons produce similar parts! (sides, heights, altitudes, medians, perimeters, angle bisectors)**

**Angle Bisector Theorem**: an angle bisector in a triangle separates the opposite side into segments that have the same ratio as the other two sides!

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**Triangle Proportionality Theorem** – if a line is parallel to one side of a triangle and intersects the other two sides in distinct points, then it separates these sides into segments of proportional length.

**Triangle Midsegment Theorem:**  and is parallel to the base

****

**Parallel lines divide segments proportionally!**

**CHAPTER SEVEN**

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**Geometric Mean:**

 OR

The altitude of a right triangle is the

geometric mean of the two parts it

cuts the hypotenuse into!

a





H



other helpful phrases: Peter Ate a Pineapple , Playful Lizzards Leap Happily or

**Pythagorean Theorem: **

Use this to find sides or prove right triangles (or acute if and obtuse if ).

**Famous Pythagorean Triples:**

3,4,5 5,12,13 8,15,17 7,24,25 9,40,41 \* only a triple if whole #s

**Special Right Triangles:**

45-45-90 x: x:  30-60-90 x: 

\*\*Tricks: If the  is a whole number, divide by TWO, attach a  to find x.

If the  is a whole number, divide by THREE, attach a  to find x.

**Trigonometry:**

SOH CAH TOA

Angles of Depression (**horizon** looking **down**)

Angles of Elevation (**horizon** looking **up**)

Take the INVERSE of the sides to find an ANGLE. Ex)

\*\*\*Make sure your calculator is in degree mode!

**Be able to solve word problems using angles of elevation, depression, and trig!!** (look at odds pg 373-375)

**CHAPTER EIGHT**

**Interior Angles:**

Sum of Interior Angles of Any Convex Polygon, Sum = 180(n-2) n is number of sides

Sum of Exterior Angles of any Convex Polygon always ALWAYS **ALWAYS** = 360

Individual Interior Angle of REGULAR polygons 

Interior and Exterior angles are SUPPLEMENTARY!!

Individual EXTERIOR Angle of REGULAR polygon 

**Quadrilaterals:**

Know **all** traits about parallelograms, rectangles, squares, rhombi, and trapezoids and what makes each one unique. For example:

**Parallelograms** – diagonals bisect each other, opp angles and sides congruent, opp sides parallel, consecutive angles are supplementary

**Rectangles** – all of parallelograms, plus all angles are right angles, consecutive sides are perpendicular, diagonals are CONGRUENT.

**Rhombi** – all of parallelograms, plus all SIDES are congruent and diagonals are PERPENDICULAR. Contains 4 congruent right triangles when diagonals are drawn in, diagonals BISECT the opposite angles.

**Square** – Baby of Rectangle and Square… SOOOO all traits of parallelograms, rectangles, and rhombi apply! Contains 4 congruent 45-45-90 triangles when diagonals are drawn in!

**Trapezoid** – exactly ONE pair of parallel sides. NOT a parallelogram. Consecutive base angles are supplementary, if an isosceles trapezoid both sets of base angles are congruent

**Median of Trapezoid** = 

Look over the set up of quadrilaterals on the coordinate plane (pg 450 # 11- 16)

**Be able to prove which type of quad using coordinates**: Here’s how I would do it… it’s not the only way!!!

Parallelogram:

* midpoint on diagonals (need to be the same)

Rhombus:

* Midpoint on diagonals

(need to be the same)

* Slope on diagonals (need to be perpendicular – opposite in sign, reciprocals)

Rectangle:

* midpoint on diagonals (need to be the same)
* distance on diagonals (need to be congruent)

Square:

* midpoint on diagonals (need to be the same)
* distance on diagonals

(need to be congruent)

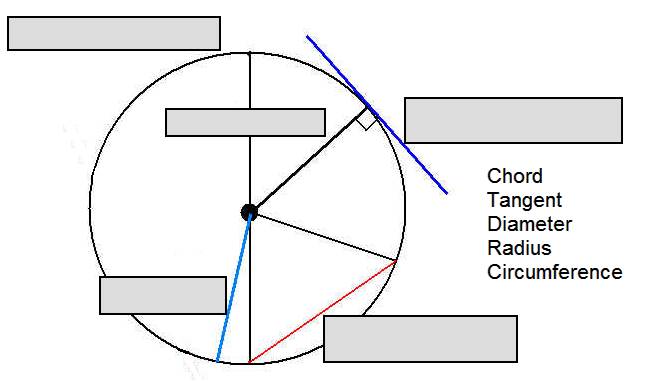
* slope on diagonals (need to be perpendicular!)

Trapezoid:

* Slope on all 4 sides to be sure exactly ONE pair parallel

Isosceles Trapezoid:

* Distance on nonparallel sides for congruence

**CHAPTER TEN**

Circumference

**Circles:**

Be able to identify parts of a circle

Diameter

Tangent

Radius

Chord

* Circumference:  or C =
* Area: 
* Any triangle that is inscribed with its hypotenuse as the diameter is a right triangle.
* Major and Minor arcs (major – greater than 180- use 3 pts, minor – less than 180 use 2 pts, semi =180)
* A circle measures 360º, a semicircle measure 180º
* Central angles are equal in measure with their intercepted arc.
* Inscribed angles are HALF the measure of their intercepted arc (or central angle), so is secant-tangent with vertex on circle!
* Chords in the same circle that are equidistant from the center are congruent.
* Opposite angles of an inscribed quadrilateral are always supplementary.
* The perpendicular bisector of any chord in a circle always runs through the center of the circle.
* A triangle inscribed in a semicircle is always a RIGHT triangle. The Hypotenuse is the Diameter!

Theorem 10.10 – If a line is perpendicular to a radius of a circle at its endpoint on the circle, then the line is tangent to the circle.

***Intersections INSIDE a circle.***

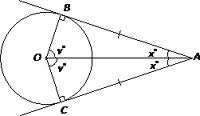
**Theorem 10.12** – If two secants intersect in the **interior** of a circle, then the measure of an angle formed is one-half the sum of the measure of the arcs intercepted by the angle and its vertical angle.

So the vertical angle =½ (big arc + small arc)

***Intersections OUTSIDE a circle.***

**Theorem 10.14** – If two secants, a secant and a tangent, or two tangents intersect in the exterior of a circle, then the measure of the angle formed is one-half the positive difference of the measure of the intercepted arcs. Soooo, exterior angle = ½ (big arc – small arc)

**Two Secants Secant-Tangent Two Tangents**

ICE CREAM CONE THEOREM! (tangents are equal!)

**As for other cases of segment lengths:**

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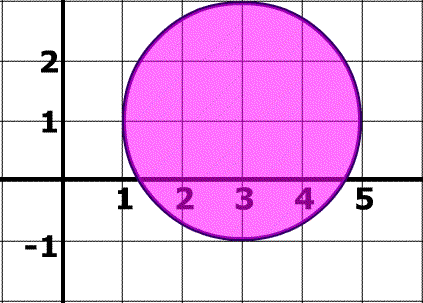
(AD)(AB) = (AC)2 (AD)(AB) = (AE)(AC) a x b = c x d

**Arc Length:** or arc length is usually represented by “  “

**Equation of Circle**  where (h, k) is the center. r = radius

Ex)  Circle with center ( - 3, 4) and radius of 4

EX)  Circle with center ( 5, -3) and radius of 5



Center (3, 1), r =2, so equation is

**CHAPTER 11**

**Area**

Rectangle or Parallelogram: A = bh

Circle: A = 

Triangle: A = ½ bh

Regular Polygon: A= ½ Pa

Sector of a Circle A =  Segment of a Circle: A = Sector - Triangle

Square: A = 

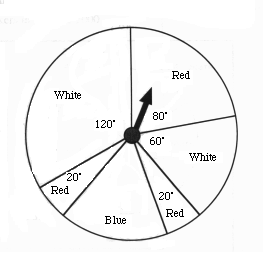
Rhombus: A= ½ 

Trapezoid: A = ½ h ()

Semicircle:

**Probability:** to find the probability of a point selected at random landing in a shaded region

Remember, for segments: find the area of the whole slice of pizza (sector), then the cheese (triangle), then subtract the cheese from the whole slice to be left with the crust (segment)! THEN, divide by the total area of the circle!



Shortcut for sectors only:

EX) prob of white =

**CHAPTERS 12 and 13**

**Surface Area and Volume of Solids**

**Prisms Cylinders Pyramids Cones Spheres Hemisphere**

**     **

**   **

**     **

**Where:**

**B = AREA formula of base (refer back to CH 11 for these formulas),**

**H = height of prism, cylinder, pyramid or cone,**

**r =radius,**

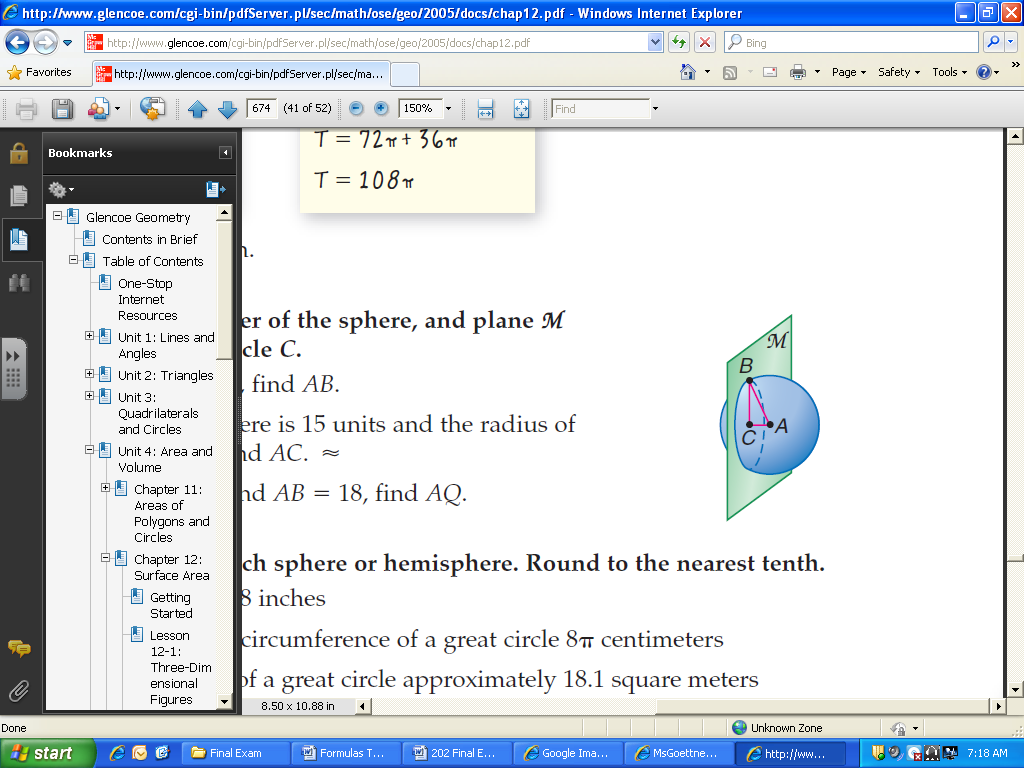
**P = perimeter of the base,**

**l = slant height.**

**LA = Lateral Area, SA = Surface Area, and V = Volume**

* **In your regular pyramids, you can create a right triangle that follows:**

**Be able to work backwards!** Knowing the SA or V, can you find the radius or side or height, etc.?!

**Sphere with intersecting plane:** In the figure A is the center of the sphere, and plane M intersects the sphere in circle C. If the radius of the sphere is 17 inches and the area of the circle created by the plane is 225 in2, find the distance the plane is from the center.

**Ratios of Similar Solids**

Scale Factor of corresponding segments: a:b

SA: 

Volume: 